

DARLINGTON'S

Mushroom News

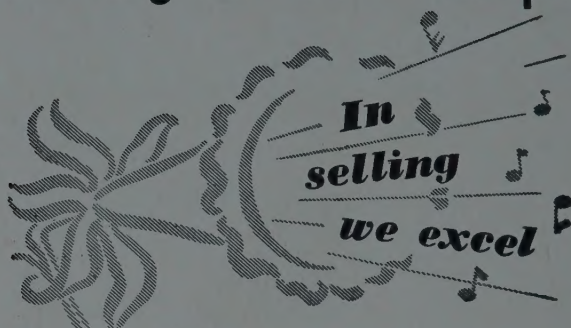
A QUARTERLY JOURNAL FOR MUSHROOM GROWERS

Vol. VII No. 7

JANUARY 1960



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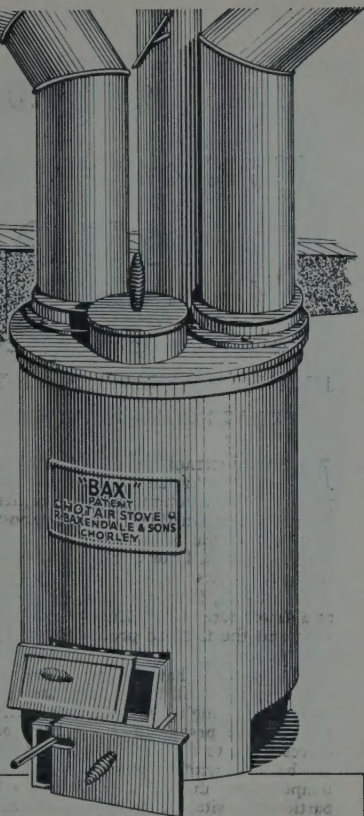


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Mushroom News

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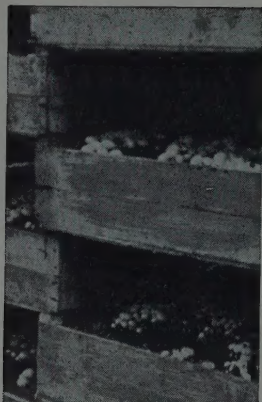
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A recent crop on open-stacked ten square foot trays at the Experimental Farm of W. Darlington & Sons Ltd. The crop produced 1.24 lb. per square foot in the first flush, and went on to yield a total of 2.5 lb/ft. in six week's picking.

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January 1960

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WORTHING

ENGLAND

Vol. VII No. 7

JANUARY 1960

Outlook Gloomy.

The mushroom grower thinks of international conferences in terms of papers read by mushroom scientists on subjects dealing with the cultivation of mushrooms in all its varied aspects, and an atmosphere of co-operation and *bon homie*. There are, however, other varieties of international conferences which affect him such as the one held lately in Tokyo, attended by representatives of the signatories of GATT.

GATT is the General Agreement on Tariffs and Trade, to which this country is a party, and the object of the agreement is to lessen and eventually eliminate all trade barriers between signatories. Tariffs and quotas, according to the agreement, are a necessary evil that should be tolerated only while there are difficulties about balances of payments between countries, and the sooner they are removed the better for all.

Those mushroom growers who find time to read anything but the trade prices and this journal, will know that the financial position of the United Kingdom has improved enormously in recent years, and that the restrictions on imports grow less every day. However, horticulture is still protected by tariffs and

quotas, inadequate though some may think them to be. The pressure from other countries to lower and eventually remove these barriers to a completely free movement of produce into this country will reach a climax in 1960.

At the same time we have the grouping of European countries into trade blocks; it is doubtful if one in a hundred people know just who is in the Inner Six or the Outer Seven, or really care very much. And yet the future, for good or ill, of the inhabitants of this island is bound up with this movement towards unification in Europe. It must be realised that the Inner Six, comprising Holland, Belgium, France, Western Germany, Italy and Luxembourg have become a very real economic unit and every day that passes they are moving towards closer ties in every aspect of their daily life.

The United Kingdom has a special problem when facing up to this vital question of going in or staying out. We are an industrial country, and the life blood of the country is the steady flow of such things as motor cars and atomic reactors through our ports to other lands. In an uncomplicated world we could trade our manufactured products for food, and let our agriculture wither away.

But we have a real memory of two world wars, when agricultural production was as vital as the manufacture of tanks and guns, and starvation was as deadly a threat as invasion.

Now the people who buy our motor cars want to sell us their tomatoes and mushrooms, and they are growing tired of hearing about our special position. They can, if necessary, buy their manufactured goods elsewhere, from the countries who are more willing to trade unconditionally. The Government will soon be faced with the prospect of making concessions or suffering discrimination. In fact, concessions are already being made in the world of pigs and fish, so that we can reach agreement with the countries of the Outer Seven.

Unless something happens to reverse the trend towards free trade, it is reasonably certain that within a few years this country will be open to unrestricted imports of horticultural produce free of duty. Is this going to be as bad as it sounds? In

arriving at an answer one or two things must be borne in mind. Firstly, the essence of all these trade agreements is that there must be no subsidising either open or concealed. In other words, competition must be fair, although wage rates will differ — though not as much as some people imagine. Secondly, our horticulture — and especially our mushroom growing — is as efficient or more efficient than that of any other European country. Where we fall down is on our marketing.

The problem is this. Can we produce and distribute horticultural products competitively with European producers? We have a few years left in which to streamline production, rationalise distribution, and to improve quality and marketing. The Government will help, but ultimately it is up to the growers themselves to prepare for the battle that lies ahead. It is well within the power of the horticultural industry to meet the challenge and defeat it, provided it takes the time given to it now to strip for action.

Notes and News

Forecast.

I predict that any girl who can make a steak-and-kidney pudding with a golden crust, tender meat, plenty of rich, dark gravy, a hint of mushrooms and a whisper of herbs will receive six proposals of marriage in 1960 —

Anne Scott-James, *Daily Express*.
Atomic Mutations.

At a meeting and exhibition of the Institute of Atomic Information, surprising new plants grown from seeds mutated by atomic radiation were shown. A peanut plant two

feet high grown in a window box at Eastbourne was exhibited, the peanuts being almond-shaped and sweeter than usual.

Members of the Institute obtain seeds that have been subjected to radiation, at 2/6d. a packet, and carry out their own trials, often in window boxes. Until the plant has developed it is impossible to tell whether it will be normal, or if mutated, what form it will take. An irradiated sweet corn produced 40 cobs on one short stem, and other experimenters report pear-shaped

tomatoes and rambling marigolds with a sweet scent.

Heavy Cropping

For those who like to crop both quickly and heavily, we reproduce a photograph sent to us by Mr. Peter H. Mayer, of Axbridge, Somerset, showing a mushroom grown on 100% Spawn. It measured over eight inches in diameter, and weighed 1lb. 2oz. No doubt it went down very well with a side of bacon and a pound or two of tomatoes!

A New Insulating Block.

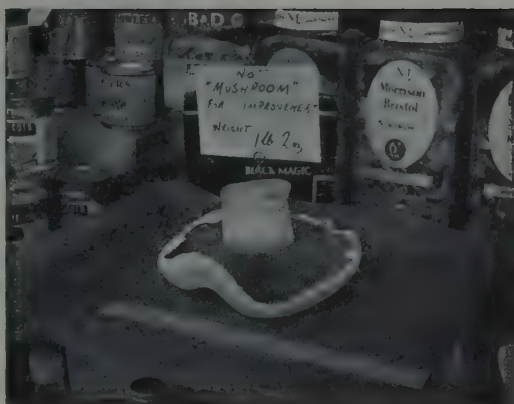
Growers may well find the new "Insulight" Hollow Glass Block worth considering for certain purposes in mushroom farm construction. The blocks are made in various patterns and types in two standard sizes, and consist of two glass mouldings cemented together so that there is an air space in the centre.

As well as excellent thermal and sound insulation properties, the blocks allow good light transmission and offer a clean, durable surface that requires practically no maintenance. A booklet giving full details can be obtained from Pilkington Brothers, of St. Helens, Lancs.

A Fork Lift Attachment.

Growers who own a Fordson Major tractor will be interested in a fork lift attachment now available for the machine.

Manufactured by Matbro Ltd., of Horley, Surrey, the attachment has alternative lifts of 9 ft. and 12 ft., with a capacity of 20 cwt., and it can be fitted to the tractor in from three to five minutes. Tilting can



be built in as part of the hydraulic system, or the attachment can be purchased with a fixed mast which can be adjusted through three positions by means of a quick release pin. The price is £295 with hydraulic tilt, and £245 without.

Mushrooms in Space.

The problem of feeding future space travellers is now occupying the attention of food scientists, and coupled with it is the question of oxygen supply for the astronauts.

One answer lies in a closed cycle in which water and human wastes fertilise plants which release oxygen and not only provide food for men or beasts but also absorb some of the carbon dioxide.

Boeing Airplane Corporation scientists in the U.S.A. are studying the fish *tilapia* which might fit into such a cycle as it eats algae which can be grown from human wastes. Mushroom cultivation in space is another possibility under investigation by the scientists, and here they come up against geotropism — the effect of gravity on plants — for in space there is no pull of gravity to give the plant a sense of direction.

THE HORTICULTURE BILL

Government aid to horticulture has provoked much argument and speculation among growers for some time. The publication of their bill, and the subsequent debate in Parliament show that it is their intention to aid growers indirectly by increasing efficiency in packing and marketing rather than by aiding growers directly through subsidies, tariffs and quotas.

THE Government's Horticultural Bill is designed to implement their promises to introduce legislation dealing with horticultural marketing, and the proposals in the Bill fall into three main categories. Firstly, it is intended to assist the actual producers to become more efficient and therefore more competitive in marketing their produce. Secondly, there would be machinery by means of which all sections of the horticultural industry, growers, employees, wholesalers, retailers and importers, would be able to work together to improve marketing and distribution. Thirdly, the Government would tackle the problem of streamlining and modernising the national central market of Covent Garden.

The first part of the Bill deals with the improvement of growers' marketing facilities, for while growing has become increasingly efficient, presentation for market has not kept pace. Well-grown produce must be well presented for market and it was not always easy for growers to find capital for this. It is therefore proposed to set aside the sum of £7,500,000 to be made to the

industry in the form of grants to enable producers to improve their methods of marketing their produce. Grants will be available to growers with not less than four acres of open land, and the minimum application that will be considered will be for improvements of £100, of which the grower would have to find two-thirds and the Government one-third. Grants totalling £100,000 would be available to central co-operative organisations for such things as the recruitment and training of managers and the provision of consultancy services, and it was considered that this would provide help to the smaller growers who relied on co-operative marketing. It was estimated that 25,000 to 30,000 businesses would benefit directly from grants, and many more by way of the grants to co-operative marketing organisations.

The grants will be available for the following purposes of specific interest to mushroom growers:— The erection, alteration, enlargement or reconditioning of permanent buildings to be used for the storage or preparation for

THE HORTICULTURE BILL—continued

market of produce, and to make or improve yards, loading platforms and ramps.

The improvement of existing heating systems in glasshouses which are in sound structural repair.

The provision of sewage disposal means and the making and improvement of roads, fences, gates, walls, hedges, etc.

The provision of electricity and water for use in connection with the preparation and marketing of produce.

The provision of thermal insulation, vapour or gas sealing for stores.

The supply and installation in suitable buildings of specified items of new plant and equipment, including plant for the control of temperature, washing and grading machines, benches, racks and conveyors.

The second part of the Bill covers the setting up of an organisation where all sections of the industry will work together on common problems. The cost of setting up this marketing council will be borne by the Government after which period it will have to be supported by the industry itself. The council would be concerned solely with the problem of marketing produce and it would be able to make representations to the Agricultural Research Council and the Department of Scientific and Industrial Research.

The Horticultural Bill was given a second reading in the House of Commons on the 20th November, and while it was passed unanimously, there was considerable criticism by members who take a special interest in horticultural affairs. The general line taken was that the assistance to be given to horticulture was of little use unless stiffened by a

tariff policy that would protect growers from foreign competition.

Major Legge-Bourke, the member for Ely, who led the attack on the Bill claimed that it would defeat its own purpose by putting more top-grade produce on the market which could not be sold. He felt that the majority of those able to find the two-thirds of the cost of improvement would not have any need of the one-third grant, and those who were really in need of the grant would not be able to borrow the two-thirds and would not have the capital to do it themselves.

Mr. J. B. Godber, winding up for the Government stressed that the new scheme did not replace the Government's tariff policy. The £7½ million was an estimate of what was required during the next five years and if it turned out to be incorrect it would be possible to go back to the house, and he went on to say, "Anyone who understands this matter knows that what depresses people about horticultural marketing is the higher quantity of lower quality produce".

I WONDER WHY . . .

. . . the fluctuations in the prices paid to growers are so rarely reflected in the prices at which we see mushrooms ticketed for sale?

It takes a really first-class glut and a smart greengrocer to produce a price ticket for mushrooms lower than 1/- a quarter. I'll guarantee at the height of summer you'll see the same old worn tag on the chips that has been there all through the year.

And come to that, how often do you see differing prices for different grades? Best cups or rubbish, they'll have the same price tag nine times out of ten.

A.B.

"One of the main causes of reduced crop yields is uneven wetting in the early stages of composting."

THE IMPROVEMENT OF CROP YIELDS

At a recent meeting in Dublin of the Mushroom Section of the Agricultural Association of Ireland an address was given by Mr. R. G. Darlington on some of the problems of commercial mushroom production. Extracts from that part of the lectures dealing with the improvement of crop yields are reproduced below.

The Raw Material.

We know from experience of old that the best crops are produced from manure from well fed working horses but such manure to-day is very difficult to come by. Whilst we may look at a load of manure and consider it ideal in appearance, we have no guarantee that it contains sufficient of the materials essential to a good mushroom crop. By and large most types of manure supplied to mushroom growers in our two countries are from very poorly bedded horses or from horses so liberally bedded that it contains very little of the droppings of the animal and therefore requires supplementing or boosting in order to provide a good compost.

On our own farm we have found that the use of chicken manure is one of the best supplements that can be used to boost riding or racing stable manure and is even beneficial on heavier types. Either battery or deep litter manure is used but deep litter manure which is made with peat as opposed to sawdust or wood chippings is to be avoided. In some cases better

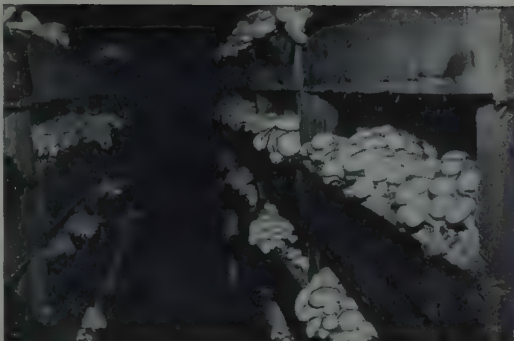
results have been obtained with the deep litter type. Other supplements will also help to boost your manure. In particular I should mention brewers grains and Wheat bran both of which have a good nitrogen content and other materials which indirectly provide food for the growing crop.

Composting.

Even with the best raw material in the world, a good composting technique is essential. Most growers have found by trial and error a system of composting which suits them and it would be unwise to change this where satisfactory results are being obtained. Even where yields are not satisfactory it is unwise to make a radical alteration in your method. Changes should be done gradually and in stages so that the effect of each stage can be judged by the results. One of the main causes of reduced crop yields is uneven composting due to uneven wetting in the early stages of composting. It is absolutely vital to ensure that every straw and in fact every part of the compost is evenly wetted before the composting process starts. You can check this on

IMPROVING YIELDS—continued

A good first flush on 'open-stack' trays on the Experimental Farm of W. Darlington & Sons Ltd.



your own farm by taking handfuls of manure from different parts of the heap at the time of filling to see whether all straws are evenly of dark chocolate brown colour. If you find a large proportion of yellowish or light straw present it is strong evidence that when the manure was originally stacked for composting, it was unevenly wetted. It is of course not easy to wet some forms of straw particularly when one tries to avoid leaching. On our own farm we make a practice of accumulating our manure at least one week before composting is due to start, the manure is layer wetted and trodden in a large heap probably 12ft. wide by 5 - 6 ft. high, or even higher. This heats up and the straw softens so that it more readily absorbs water when the first stacking is made a week later and a far more consistent compost is obtained. It is, however, no good adopting this procedure unless great care is taken at the first stacking to ensure even distribution of water. There is no doubt that this can be a very laborious business but it will be found well worth while in the final results.

Pasteurisation and Peak Heating.

As you know, this has two main purposes, true pasteurisation which is designed to kill off diseases and pests and secondly to complete the composting process or to condition the manure ready for spawning.

Pasteurisation is essential whatever form of compost process you

adopt, as it ensures freedom from such disease organisms as Mat disease, etc. With a rapid or short composting process, however, pasteurisation itself is not enough; the compost requires to be conditioned to complete the composting process. Where many growers go wrong is in the use of too much air during the pasteurisation process. This results in loss of temperature and, as a result, more steam has to be put in to regain the lost heat. In this way the compost soon becomes waterlogged. The length of the pasteurisation process is also important. This should be carried on just so long as is necessary to achieve pasteurisation or to ensure that the compost is completely free of ammonia. Pasteurisation for any longer period than is necessary to achieve these ends may reduce your ultimate yields. It is, of course, essential for efficient pasteurisation that your trays or shelf beds are not too tightly tamped at the time of filling.

Spawning.

I am frequently asked which type of spawn I recommend - manure or grain spawn. I am by no means convinced that grain spawn is nec-

IMPROVING YIELDS—continued

essarily capable of higher yields than manure spawn. So much depends upon the grower's methods and his system of cultivation. For intensive tray system growing where time is important and the cropping period short, grain spawn is, of course, preferable. For the longer cropping period and for larger, better quality mushrooms, under all conditions, manure spawn is undoubtedly preferable and seems to suit most growers better. There is a tendency with grain spawn to obtain heavier yields in the first few weeks of cropping and then for the crop to tail off very sharply. Manure spawn, on the other hand, tends to produce lighter first flushes but better continuity of production later in the crop. If conditions are not ideal the size of the mushrooms produced from grain spawn tends to be smaller due perhaps to the more vigorous growth obtained, but such vigorous growth does not imply high yields under all conditions.

Through Spawning.

A much more rapid spawn run is obtained by this method and earlier cropping results. It is possible to case much earlier — sometimes 7 - 8 days after spawning — and the crop comes into production much sooner. Higher yields are usually obtained and in our experience these average between 20 and 30% over yields obtained by the orthodox methods of spawning. It is not quite clear whether these increases are entirely due to the increased number of starting points or to the fact that the spawn becomes established throughout the compost more quickly. The aeration given to the compost in the process of through spawning can also be beneficial and the earlier cropping of course extends the total cropping period.

This method of spawning is well worth a trial by all growers even if special machinery for through spawning is not available. In this case the labour cost is substantially higher but it is more than outweighed by the increased yields obtainable.

I should also, at this stage, mention the benefits obtainable by an increased rate of spawning particularly where through spawning is carried out. Many farms have now increased their rate of spawning to one carton of grain spawn to 20 sq. ft. of bed area. I realise this may sound like sales promotion for the benefit of spawn suppliers but it is an undoubted advantage to cropping and very worthy of a trial.

I should add a word of caution as to the dangers of through spawning where some contamination is present on the farm — not only does it provide an opportunity for disease organisms to enter but if pasteurisation has not been efficient or if some adverse factor is present in the compost, this will be spread through the compost by through spawning in the same way as the spawn is spread and more trouble may be expected.

After through spawning, temperatures during spawn run tend to be very much higher and this, too, may encourage development of diseases which perhaps would not have otherwise caused serious trouble. Great attention to spawn run temperatures is essential if this method of spawning is adopted. It is also particularly important to ensure that the bed temperatures are reduced to 60 - 62 F. within 4 - 5 days after casing or difficulty in crop management and perhaps reduced yields may be expected due to the formation of stroma or overlay.

INCIDENCE OF TRUFFLE INFLUENCE OF TEMPERATURE

From Dr. E. B. Lambert,
United States Department of Agriculture,
Agriculture Research Service,
Beltsville,
Maryland, U.S.A.

"Dear Dr. Ramsbottom,

"I read with a great deal of interest your article on "Truffle" in the July issue of Mushroom News. Diehl and I corresponded with Miss Gikley about naming this fungus in 1928, and at the time she agreed it would be best to place it in *Pseudo-balsamia* until a more detailed study could be made.

"You may be interested in learning that we believe we know why the truffle fungus appeared for the first time within the space of a few years in many mushroom growers' beds in the United States, in England, in Australia, and in South Africa. Before 1925 growers in the United States, and I believe all over the world, tended to grow both the spawn and the mushrooms on the beds at the same temperature (between 50° and 55° F.). Shortly after this time we began to realise that the optimum temperature for

rapid mycelial growth in the beds was closer to 75°. Also, a crude form of peak heating was evolving at about that time. This aided in holding down pests, and as a result growers began to "run" their spawn in a range between 70° and 75° temperature and grow the crop at between 50° and 55°. This practice spread all over the world in the early thirties. From Kligman's experiments we, of course, know now that these conditions "cause" truffle by permitting the (otherwise dormant) spores of the truffle fungus to germinate. Owing to this change in practice then the mushroom beds throughout the world simultaneously became suitable "petridishes" for the development of truffle spores that were already present in soils everywhere.

"I hope this note will be of interest to you. Sorry that we were not able to spend at least a few hours together when I was in England."

BOOK REVIEW

"*Die Champignonkultur*", (*Mushroom Cultivation*), by Wilhelm and Erich Geiss. Published by Eugen Ulmer, Stuttgart, Germany.

This work is a comprehensive guide to mushroom growing, now in its fourth edition. English readers will be interested in the remarks on page 53 to the effect that mushroom washing is totally unnecessary because the skin can easily be peeled off! "*Water is the enemy of the*

noble mushroom flavour", write the authors.

It will also be of interest that 'Brown Disease' has not been reported anywhere in Germany. The authors give details of the disease, suggesting that it is probably of virus origin and therefore transferable.

A. G. POINTING

Agaric Ltd., Bradford

There can be few growers who have not heard of Agaric Ltd., where the mushrooms are grown in many miles of caverns under the Cotswold Hills. It is not our intention in this article to give details of the farm or the method of cultivation employed, but to turn the spotlight on Mr. A. G. Pointing, himself well known to mushroom growers.

A NY mushroom farm surprises and delights the layman who has never seen cultivated mushrooms growing before. It would take a very unusual farm to surprise the hardened commercial grower, but Agaric Ltd. of Bradford-on-Avon, undoubtedly has that distinction for there can be nothing quite like it in the British Isles. Mushroom growing in caves may be quite the rule on the Continent, but it is almost unknown in this country.

It is an eerie experience trailing the beam of an acetylene lamp through miles of underground caverns, treading between neat rows of ridge beds that stretch endlessly into the hillside. The light is reflected from limestone walls and roof or is caught by the mysterious swell of a vast polythene duct distended by fans so far distant that they cannot be heard. One wanders through empty caverns, big enough to drive a bus through, and then suddenly there are beds of mushrooms or rack upon rack of trays. In the distance a sudden gleam of lights and the echoing chatter of girls busy picking, a

hundred feet of rock above their heads and a thousand feet of darkness between them and the entrance to the quarry.

But there is nothing mysterious about Mr. A. G. Pointing and his two sons, Keith and Roy, who are rapidly turning this underground mushroom plant into one of the biggest in the country. Their target is a round figure — a million pounds of mushrooms a year! And they hope to reach this rate of production by the end of 1960.

Mr. Pointing is active, alert, and very much 'on the ball'. He comes of growing stock — his father was a market gardener — but he himself turned to things mechanical. In the first World War he joined the Royal Flying Corps, and as a sergeant-pilot he won his commission in the field, or rather in the sky flying planes of wood and canvas braced with piano wire. Hostilities over he returned in 1919 to the Motor Industry to which his father had apprenticed him and which he had left shortly after the outbreak of war. During the inter-war years he remained in the Motor Industry,

ESQ.

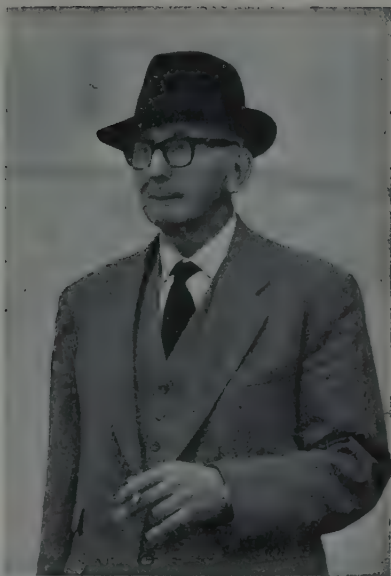
d-on-Avon

was a keen amateur horticulturist but never gave a thought to growing Mushrooms. In the second World War he stayed on the ground, this time a gunner captain and adjutant, and with peace the grower strain in his blood asserted itself and he took over an eighteen-acre market garden near Leeds.

Among other crops he rotated rhubarb with mushrooms and the fascinating fungus took a firm grip on him as it does on all who cultivate it. To grow mushrooms successfully was a challenge to his skill as a horticulturist and A. G. Pointing is not a man to refuse a challenge.

From now on it was mushrooms all the way. The market garden in Leeds was taken by the Corporation for a development plan, but by then A. G. had an interest in Agaric Ltd. at Bradford-on-Avon and he turned his whole attention to mushroom growing. The firm of Agaric is probably the oldest whole-time mushroom growing undertaking in the country for it was founded in 1914 by a Frenchman and has been in continuous production (with ups and downs!) ever since. As an interesting sidelight, there are still three of the original employees at work on the farm.

A.G. has unlimited faith in both the mushroom and the mushroom industry and that is why he contem-



plates his target of a million pounds a year with complete confidence. "The basis of the mushroom industry is the demand for mushrooms", he says, "and that basis is now firmly established, and the demand will increase. Demand is better than it has ever been, and will continue to get better".

Expansion is inevitable in his opinion. To make growing efficient, growers must mechanise, and to make mechanisation efficient they must expand until their resources are fully occupied. "You can't restrict production", he claims. "Let the public have cheap mushrooms and they will eat all that the industry can produce".

Gluts of mushrooms and give-away prices may have given growers a temporary set-back but they have had a tremendous effect in popularising the product. Already people are losing the old and deep-rooted

idea that mushrooms are something special, a highly priced luxury for the rich. They buy them when they are cheap and they keep the habit when prices rise again.

It is the point-of-sale that counts in Mr. Pointing's opinion. "We've got to get the retailer interested in mushrooms. Too many have regarded mushrooms as a necessary evil, something to break even on. The sooner we persuade them they can make as much profit out of mushrooms as they can out of anything else, the sooner they will give them full attention and turn them over rapidly".

He makes the interesting point that the production of the mushroom's principal competitors in the common market, eggs and bacon, is about as efficient as it can ever be. Eggs and bacon cannot get cheaper, only more expensive. But there is still ample room to increase the efficiency of mushroom production so that mushrooms can become a staple item of breakfast diet. In a few years mushrooms should be nearly as much a part of the housewife's shopping list as tomatoes.

However, continued expansion must inevitably spotlight the relatively limited supplies of the raw material of the industry, horse manure. Farsighted growers must start thinking seriously about what they are going to do in the future when they cannot obtain all the manure they want. Suitable and economical synthetic composts must be perfected if production is to be maintained.

Despite the trend towards ever larger mushroom farms, Mr. Pointing considers that there is still plenty of scope for the small grower because of the personal attention he can give to increased efficiency. In fact, as

he puts it, 'The bigger you are, the more dangerous it gets' and is reminded of a remark he heard Lloyd George make in Leeds many years ago to the effect that 'the higher up you climb, the colder it gets!'

As to growing mushrooms, he thinks it to be one of those rare hybrids, both an art and a science. A good mushroom scientist does not necessarily make a good mushroom grower if he lacks the art. But at the same time it is only fair to say that a good grower must have a feel for the science of growing if he is to make good. But whether artist or scientist, the true mushroom grower is a dedicated man and mushrooms become his whole life.

Talking of his other activities, Mr. Pointing remarks how every cave has its own peculiarities and a full understanding of these is necessary if the best is to be got out of them. Factors that affect the caves include the depth below the surface — all his caves are cut out of hills — and the slope of the cave, whether descending or ascending. Then there is the availability of air shafts within the cave, and the distance of individual growing areas from the entrance.

Growing in caves has certain advantages, the chief of which is its partial independence from exterior temperature fluctuations. Thus throughout the long, hot summer production at Bradford remained constant while other growers were fighting a difficult battle with temperature and humidity. This remarkably even level of production throughout the year enables Agaric to maintain a constant supply of their high quality mushrooms to markets all over the Midlands and South Wales.

PROFILE—continued

The temperature in the caves remains within the range 52° - 56° Fahrenheit, and growth is therefore slow in comparison with the high pressure production on other farms. However, quality is extraordinary good at these temperatures, and what is more important, pests and diseases do not develop as rapidly and menace production in consequence as so frequently happens when temperatures are ten degrees higher.

The early method of growing in the caves at Bradford was traditional ridge beds, but during the last few years there has been a partial change, the compost being filled into trays, pasteurised in heat rooms away from the caves, spawned, and after the

run taken to the caves, some for making up into ridge beds, and some, after casing, for growing in the the normal tray method. Already more than half-way towards the tray system, Mr. Pointing is planning to go over entirely to this method during 1960, and hopes eventually to achieve his target figure of one million pounds per annum.

He has high hopes for the future. With the steady increase in the standard of living, the demand for mushrooms will increase, and keep the industry prosperous and expansive. But for complete success growers must set themselves a high standard of efficiency in production, and a high standard for the produce they intend to offer for sale.



Johnny Morris, well known on television and radio was a recent visitor to the mushroom caverns and is here seen expressing dismay at the prospect of picking the day's crop.

MARKET SENSE AT COVENT GARDEN

by W. F. DEEDES, M.P.

We reproduce below, by kind permission of the Editor of The Daily Telegraph, an article about Covent Garden. A plan to reduce the size of the great market should bring some order into its time-hallowed chaos of fire risk and traffic paralysis.

SPREAD across 30 acres of Central London, confronting the traffic like some gigantic bunker designed by a mad golf architect, lies Covent Garden, the biggest market in the country. It has been there since 1670, and is still regulated by an Act drafted in 1828 which refers throughout to waggons and carts.

It has defied change, government, local authorities, Royal Commissions, the police and imaginative architects. Illogically one feels a tinge of regret on learning that determined plans are afoot to reduce its bulk and introduce some semblance of order.

Lord Runciman's Committee on the Horticultural Industry, which reported two-and-a-half years ago, made it plain that Covent Garden had reached a point when it was not only an obstacle to traffic but a

ludicrous impediment to its own business.

At 6.30 a.m., they said, 1,500 vehicles, many of them heavy trucks, may be stationary in the market area. It is not unusual, they reported, for a grower's lorry to wait five hours to be unloaded.

It is almost impossible to estimate the cost of these delays in lost man-hours and vehicle-time, and in deterioration of produce.

In these circumstances up to 750,000 tons of produce enter the market every year by road.

The trade manages to function, and inefficiencies are accepted because people have become accustomed to them and because, individually, traders can see no prospect of being able to improve things.

Covent Garden is a spectacular example of what custom will persuade the human race to endure.

Why Not Move?

Added to this is an appreciable fire risk. The labyrinth of narrow streets surrounding the central market area, crammed with wooden containers, full and empty, could

Covent Garden Opera House is flanked by the rows of heavy goods vehicles leaving barely enough room for the hand-barrows to move.



MARKET SENSE AT COVENT GARDEN—continued

Another jam as the double-banked vehicles obstruct through movement of traffic into and out of Covent Garden.



start and spread a fire of historic proportions.

It will occur to some to ask: "Why not move the whole business elsewhere?" Lord Runciman's Committee dealt with the resiting of Covent Garden cogently. They could suggest no better place, in London, where Covent Garden's essential functions would cause less traffic congestion; and they hinted that commercial development would do little to ease traffic.

They also rejected the idea of rebuilding, fearing that this would increase and not diminish the market's magnetism and so the volume of business done. They chose the course of reducing Covent Garden's bulk by separating its present functions. The Government concurred with them.

So there is now a plan. It will be slow to implement because the Minister of Agriculture, who has taken charge, senses that the remedial action which can be taken under a statute of George IV is limited, and fresh legislation will have to go through Parliament. Its primary purpose will be to set up a Covent Garden Market Authority. Waiting for this does not preclude some physical improvements. The plan in outline is:

To concentrate the market at Covent Garden into a smaller area and induce it to become a centre for sale by sample only:

To provide, two miles away, at the junction of Old Street and City

Road, an annexe of five acres where empty containers can be stored and bulk produce sold.

The worst and most dangerous confusion in the market area arises from the huge traffic in empty returnable containers. These are dumped by growers and traders, sorted by porters, and returned to the market firms who own them. All this combustible shuffle and stacking takes place within the market's 30 acres.

Exasperated by Covent Garden's bulk, the City of London and the London County Council concocted and served up to Parliament in private Bills a few weeks back a plan to give the vacant Caledonian Market to the storage of these empties.

That card will now be trumped by the Minister's later plan which promises to accommodate bulk produce as well as empty boxes.

To assess the virtues of this project it must be understood that 70 per cent. of Covent Garden's customers are secondary wholesalers, the rest retailers. A large proportion of the big dealers, it is hoped, will be willing to visit



Covent Garden, inspect and approve samples and collect the bulk purchase two miles away.

This act of faith would be facilitated if British horticulturists had learned, as continental exporters have had to learn, to grade produce reliably. Sound grading is a concomitant of purchase by sample.

Jumping that hurdle, the aim is to persuade traders to entrust handling and loading in the annexe to an independent staff provided by the Central Market Authority. That would save manpower — and perhaps something on the price of a lettuce.

A reassuring feature of the Old Street—City Road site is that all lorries will be able to move off the road into the annexe and wait to do their loading there. What causes *arterio sclerosis* at Covent Garden is not the number of lorries moving

Blocks such as this can last for four or five minutes, during which only the handbarrows remain mobile.

Double and in places treble-banking reduce traffic flow to a single line and even this is often stationary

in and out early in the morning before normal traffic is astir, but the number which must remain stationary until far into the morning, often afternoon.

Thus by statute and persuasion we may soon be able to translate Covent Garden

131 years from a state of affairs whereby it was forbidden to :—

put or place any Wagon, Cart, Fruit, Flowers, Vegetables, Roots or Herbs, Bulk, Stand, Stall, Stallboard, Form, Wheelbarrow, Cask, Basket, Package Hamper, or other Thing, in, upon, or over any of the Footpaths, Gangways, or Passages of or in the said Market.

Surely some imaginative artist will contrive that on the night of this memorable transition the curtain shall rise in another part of Covent Garden upon a ballet to commemorate the transformation scene.



THE SPAWNMASTER SPAWNING AND CASING MACHINE

For the larger grower a spawning machine is fast becoming an essential item in his mechanisation programme. Not only does it save labour, but allows improved through spawning and better casing, so leading to increased yields.

ANY means that reduce the time between spawning and cropping must be of advantage to the grower, for during this time his mushroom house is non-productive, yet eating up its share of overhead costs. This is especially so on farms where the beds or trays are cropped for six or seven weeks, for if the crop can be brought in a week earlier, then the cropping period is in effect extended by seven days, and the weight of crop picked is that much greater.

For some years our Experimental Farm carried out trials in methods of spawning, and it was found that if grain spawn was intimately mixed into the compost, the spawn run was much faster, for the distance between grains throughout the compost was reduced and there were any number of initial growing points from which the mycelium could grow out into compost. Obviously this method of spawning had advantages over the tradit-

ional way of spawning with manure spawn at intervals of several inches, or scattering grain spawn over the surface. Mr. R. G. Darlington drew attention to these trials in his paper at the Southport Conference in 1957, and gave the method of spawning the name 'through spawning'.

A number of growers tried through spawning and found that not only was the yield increased on a purely time/weight basis as a result of the increase in actual cropping days, but also the total yield to be expected from the compost also increased. The reason for this is obscure, but

A ten square foot tray of compost being emptied on to the conveyor belt. The lower conveyor on which the tray is carried can be seen clearly below.



THE SPAWNMASTER—continued

A tray that has been through spawned is moving along the roller conveyors for tamping. Another tray has just been emptied on to the conveyor.

could be that with an even mycelium run throughout all levels of the compost, available food materials are fully exploited. It is probable that where the grain spawn is scattered over the surface of the compost the lower levels are never fully exploited before cropping is ended.

However, the success of through spawning was such as to warrant its adoption as a standard practice on a number of farms, and inevitably there arose a demand for a machine that could do the work efficiently and speedily.

The Spawnmaster Spawning and Casing machine was produced as a result of practical trials under actual working conditions, and it can be justly claimed that it not only mechanises the spawning operation but also that it does the job better than hand spawning, that it increases the aeration of the compost — and therefore improves it — and also can be used for mechanical casing.

The machine is basically a framework of channel and angle iron



supporting two conveyors, the top one of reinforced rubber, the lower one of slats. The compost filled tray is emptied on to the top conveyor belt and the empty tray is then placed on the lower conveyor. The spawn is scattered over the compost as it moves forward, but the movement of this belt is checked and the compost is not released into the flail for mixing until the tray on the lower conveyor has advanced sufficiently far to trip a release mechanism. Then tray and flail are synchronised, the compost being thoroughly stirred and aerated, the spawn mixed into it, and it is allowed to fall into the empty tray. The compost-filled tray then passes on to be tamped and moved away along roller-conveyors for stacking on a pallet.

Using a 3 foot by 2 foot tray, the Spawnmaster is capable of spawning 2,430 square feet of compost in 1½ hours, and this represents a saving of approximately 40 man-hours. Machines designed for larger trays spawn proportion-



At the delivery end of the machine the compost is returned to the tray which has been moving forward on the lower conveyor belt.

THE SPAWNMASTER—continued

ately higher areas; thus using 9 square foot trays, 3,645 square feet can be spawned in $1\frac{1}{2}$ hours.

The standard machine is for 3 foot by 2 foot trays, and is 48 inches high, 138 inches overall length and 36 inches overall width, with an all-in weight of 1,120 lbs. Machines can be made, however, to cope with any size of tray and the manufacturers will be glad to discuss particular spawning problems with growers.

For casing, the compost-filled trays are placed on the lower conveyor and the casing mixture is fed on to the upper belt. A grader levels off the casing on this belt to the required depth and it is carried forward to fall on to the compost.

The advantage of mechanical casing is that exactly the same depth of compost is placed on the tray, conforming to variations in the surface level of the compost, and there is no question of too little casing in one place and too much in another. This makes for much more regular flushing in the trays than occurs where casing is carried out by hand.

The Spawnmaster for 3 foot by 2 foot trays is priced at £440 0s. 0d. for 3-phase electrical supply, and £470 0s. 0d. for single phase supply. It is manufactured by E. B. Burdon (Engineers) Ltd. of Beaconsfield Forge, Kingfield, Woking, Surrey, who will be glad to supply further information to growers.



Some items of interest from our Postbag

Mat Disease

We have been having persistent trouble with Mat Disease on our mushroom beds and wonder if you have any fungicide to suggest?

Mat Disease is very easily carried over from crop to crop and is difficult to eliminate unless stringent precautions are taken. The diffi-

culty is that the temperature at which the trouble is killed is not far removed from the peak heat temperature of 140°F. Unless therefore, every peak heat is absolutely efficient there are always sufficient 'cold spots' in the manure which do not quite reach this temperature and in which the Mat Disease spores survive. The trouble is accentuated if certain areas are more compressed, or rather wetter or contain relatively unbroken droppings. Such areas provide focal points for the disease, from which it will spread out rapidly into the pasteurised compost.

Where conditions allow, i.e., under the shelf system, adding copper sulphate solution to the compost has proved of great value in suppressing the tendency for the spores to germinate. The use of copper sulphate is not possible in the rapid fermentation system as the ammonia present inactivates the copper sulphate.

As you are using the tray system the first step to take is to ensure

QUESTION BOX—continued

that your peak heat is as effective as possible and it would help if the temperature is allowed to go up to 145° F. This temperature is not too high to cause trouble from *Chaetomium*, etc., but care should be taken to avoid drying out the compost.

Alternatively, the peak heat temperature should be maintained to within 12 hours of completion. The air temperature should then be increased to 160° F. so that the whole of the compost in the beds or trays including the surface layer reaches 140° F. After holding this temperature for 8 to 12 hours, the air temperature is dropped rapidly and the compost allowed to cool down.

Another important aspect of the problem is to ensure that the disease, if present, is not carried on to the next crop, and this means that there must be an effective cook out at the end of the crop.

If cooking out is not possible, spray the boxes of spent compost thoroughly with formaldehyde solution before the houses are emptied and when emptying, all the other mushroom houses on the farm should have the ventilators tightly shut.

Reference to your information also suggests that you could, with advantage, increase the length of time of peak heating by at least 12 to 24 hours, as 26 hours is rather a short period if complete heat penetration throughout the whole of the compost is to be obtained.

Excessive Temperatures

In your letter of the 15th December you warn me to be cautious when using the Heat Steriliser Unit as a booster during peak-heating in case the temperature of the compost goes

too high. Surely the higher I can raise the temperature during peak-heating the better, for temperatures in the lump during composting often exceeded 180° F.

The composting process begins as a fermentation process during which under the influence of moisture, bacterial action generates heat and ammonia is liberated. This fermentation process then develops into a mainly chemical process in which spontaneous action takes place under the influence of ammonia and moisture. Temperatures of up to 180°F. are reached and conditions are such that caramelisation occurs and complicated food materials necessary for spawn growth are formed. If the compost heap is then left to its own devices the temperature rapidly falls to that of the surrounding air, showing all action has finished.

In order to eliminate diseases and pests which may have survived in the outer layers of the compost heap, peak-heating (or pasteurising) was introduced. It was found that temperatures of 140° F. in the compost maintained for at least 24 hours would complete the composting process and eliminate trouble. If temperatures were allowed to rise above 140° F. for any length of time this only resulted in a breakdown under such conditions, of the carefully prepared food supplies, thus undoing a very great deal of the original composting process. Products formed as a result of the breakdown also encouraged undesirable moulds and competitors to spawn growth.

It is therefore important that peak-heating should be controlled by the grower during the whole period of operation.

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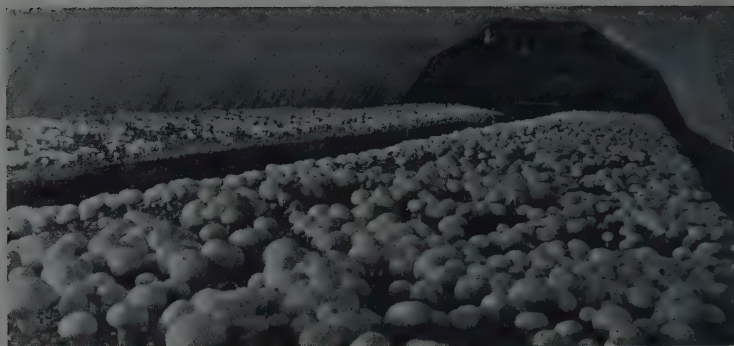
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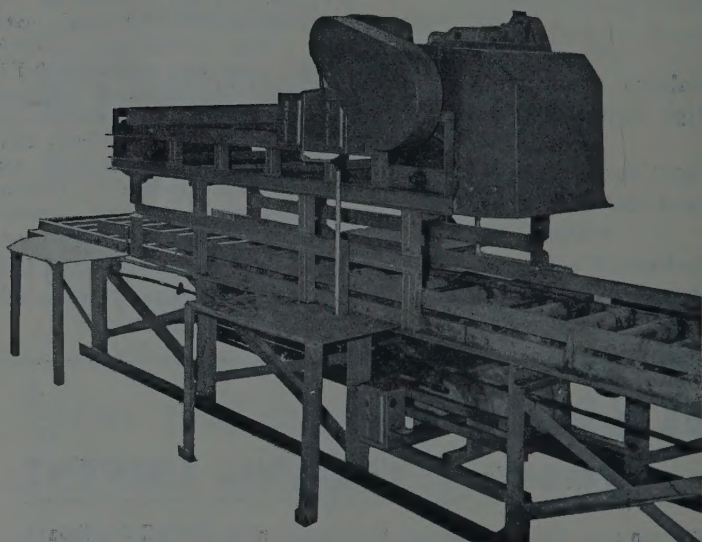
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Bradford

HENRY BROOK, St. James' Market, Bradford. Tel.: Bradford 21871. Telegrams: Gooseberry, Bradford.

Bristol

DAN WUILLE & CO, LTD., 30 Welsh Back, Tel.: Bristol 26351-2 Telegrams: Wuille Bristol.

Cardiff

DAN WUILLE & CO, LTD., 2 Little Tredegar Street. Tel.: Cardiff 32841, Telegrams, Wuille, Cardiff.

Covent Garden

BROOME & GREEN (LONDON) LTD., 27 James Street, Covent Garden. Tel.: Temple Bar 7856 Telegrams: Bourguize, London.

CHARLES KNIGHTS, LTD., 501, 2, 3, 4, 5, Central Market. Tel.: TEMple Bar 5272, 9867.

DAN WUILLE & CO. LTD., 100-104 Long Acre, Tel.: TEMple Bar 7952, Telegrams: Wuille, Rand, London.

Leeds

J. WOOD & SONS, Kirkgate Market, Leeds, 2. Tel.: Leeds 30138. Telegrams: Woods, Leeds 2.

Manchester

SOMERS & GIBSON, LTD., Smithfield Market, Manchester 4. Tel.: Deansgate 3666. Telegrams: Muscatel, Manchester.

FRED BRIDGE, Smithfield Market, Manchester 4 Tel.: Deansgate 4835 & 2802. Telegrams: Fred, Bridge, Manchester. Established 1888

Sheffield

J. C. LUCAS & SONS, LTD., Castlefields Market, Sheffield. Tel.: Sheffield 22618.

Southampton

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